

# SMART SHOE FOR WOMEN SAFETY

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**Abstract**—The world needs to be concerned about the women around and treat them the way they deserve to be treated. Despite having so many laws for women, it doesn't stop thieves, assaulters or molesters to abuse women. This paper suggests a smart shoe that not only helps women take care of themselves but also help them be fearless. This project makes use of GPS, GSM modules, a shock circuit and camera, that are interfaced with Raspberry Pi board and Arduino. Women facing any troubles or in any kind of danger, can immediately make use of this device, embedded in their shoe to escape from the dangerous situation and even harm the attacker.

**Keywords**—Women safety, IoT, live streaming, GPS, GSM, gender issues, electric teaser, smart shoe

## I. INTRODUCTION

Moving along with the fast pacing world may be a bit hard but it gets even harder if you are a woman. Though women have achieved high accomplishments and have even served India on honorable positions like The President and The Prime Minister yet they need safety surety and it doesn't sound feasible if they have to get a guard 24\*7 around them for protection, so what can these women look up to? A safety device that they can always carry with them which would make them independent and confident.

This paper introduces the users to a smart shoe that women can use to alert their family members and even harm the attacker. Section 2 of this paper contains the related works, section 3 has the proposed methodology proceeded by the description and the implementation in the section 4. Section 5 has the results and Section 6 concludes the paper with future work.

## II. RELATED WORKS

There are mobile apps in the market developed for the safety of women specifically designed for android or iOS, some of which have paid premium features that may help save a life in threatening situations ,for example - VithU App[1]that allows you to send SOS alerts to the listed contacts by just pressing the power key of the phone twice. It also sends the GPS location every time the power button is pressed. Life360 Family Locator App [2], this app lets you create a circle of friends and family and allow them to see each other's location on a confidential map. Additional feature of the app includes tracking your phone if it gets lost or stolen.

An emergency watch[3] was made by Punith Kumar and Shiva Kumar that uses Atmega 328 Microcontroller and have GPS module to detect the location and display it on the watch ,it also has a voice recognition module that saves the voice in a sim card and sends it to the nearby police station that can be further used as evidence too.

[4] SHE- Society Harnessing Equipment developed by Manisha Mohan, Niladri Basu Bal, Rimpi Tripathi had sensors and shock circuit board attached to the inner wear whereas the underlying layer in contact with skin is insulated with the help of a polymer. The circuit is placed near the bosom because women are attacked there first, in case of eve-teasing or rape.

[5] Smart Belt, this system was designed with a portable device which resembles a normal belt. It consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help.

## III. PROPOSED METHODOLOGY

This paper suggests a new technology to protect women. It focuses on their security so that they never feel helpless. The paper consists of various modules such as GSM, GPS, shock circuit, camera and Raspberry pi-3. The basic idea of the project is alarming the emergency contacts on pressing the emergency switch located on the side of the shoe. Inside the shoe, there are GPS and GSM modules that combinedly send the location to the emergency contact. The shock circuit generates a shock of 400KV that is sufficient to buy the victim enough time to escape. Meanwhile, on pressing the switch, message will be sent asking for help containing a link that directs the guardian to Amazon Web Services Kinesis that offers live streaming or to a google drive link (by MotionEyeOS) where 30 seconds short clips would be saved. The live video is recorded with the help of camera. The 5 V battery used in the shock circuit is powered by piezoelectric sensors connected in series at the sole of the shoe. Figure 1 shows the block diagram used in this paper.

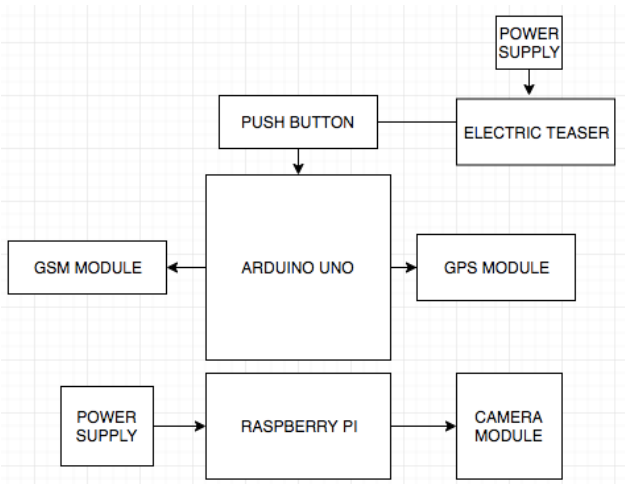


Fig 1: System block Diagram

The main controllers used in this project are Arduino Uno and Raspberry Pi. There are GPS and GSM modules connected to Arduino whereas the camera module is attached to Raspberry Pi. If a woman is walking alone or faces any danger, she should immediately press the emergency button present on the shoe. As soon as the button is pressed, electric teaser is activated which can be used to give shock to the attacker, the electric teaser produces 400KV shock, simultaneously, GPS and GSM modules are activated with the help of Arduino Uno. GPS module calculates your exact location by knowing the latitude and longitude position whereas the GSM module sends the location

of the person as well as a link that contains the video live streaming which will help in identifying the attacker and also keep them updated about the situation to bring help accordingly. The camera module works on Raspberry Pi and can be kept on even before stepping out of the house at night or to lonely places. This paper used Motioneyeos for storing videos to the google drive. The camera can be embedded into a locket and hence could capture proper timeline of events. Alternatively, another switch can be used to start the camera's capturing feature. The GPS and GSM modules miniature version chip can be included in the real shoe like its done in cell phones so that it can easily fit inside the sole of the shoe. Our choice of shoe is really handy because even if the hands of the women are tied up, they can still press the shoes against each other to activate the switch or press it firmly against any object or even the ground to alert the pre-stored emergency contacts. Similarly, the women can give shock to the attacker by just kicking backwards which is very easy and intuitive too. Also it is not easily guessed if the emergency button would be present on the shoe. The total hardware setup is shown in Figure 2.

#### IV.HARDWARE DESCRIPTION

The diagram of components available inside the shoe module is shown in Figure 3. This module consists of GPS and GSM modules which are described in the subsequent section.

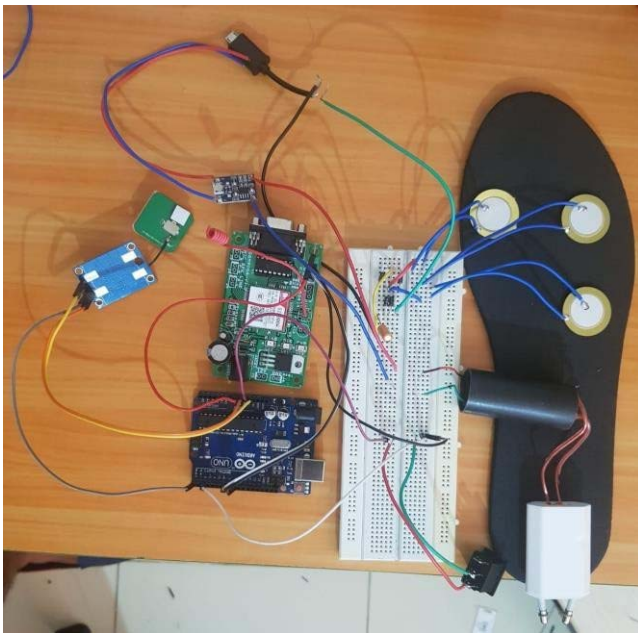


Fig 2: Circuit Diagram of the model.

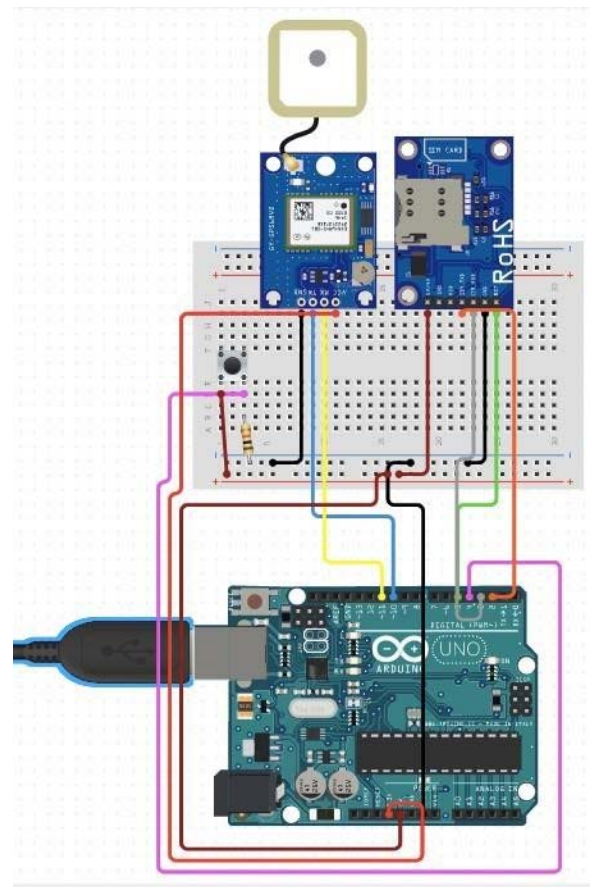


Fig. 3: Circuit Diagram: Shoe Module

### A. GPS module

GPS is a space-based satellite navigation system. It provides location and time information in all weather conditions, anywhere on or near the Earth. A minimum of four satellites may be required to compute the four dimensions of X, Y, Z (latitude, longitude and elevation) and time. GPS receiver converts the received signals into position[6].

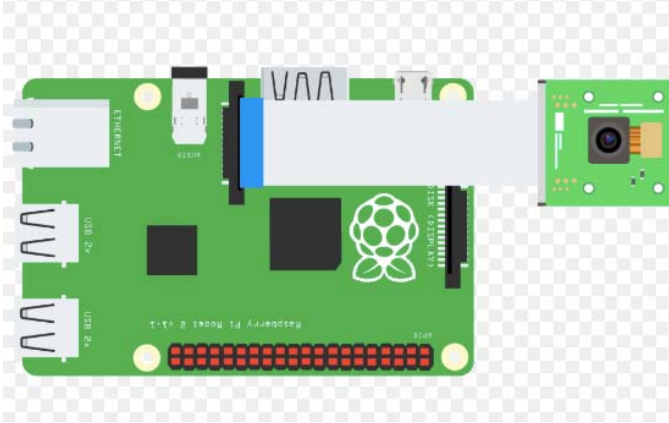


Fig 4: Circuit Diagram: Locket Module

### B. GSM module

A GSM module is a specialized type of module that accepts a SIM card and operates over a subscription to a mobile operator just like a mobile phone[6]. It delivers messages to the pre-stored numbers in case of an emergency and hence alerts the family members. This is the most important part of the project.

Both the GPS as well as the GSM modules are interfaced with the Arduino as seen in Figure 3. Circuito.io site has been used to make that circuit.

### C. Camera Module

A camera module is an image sensor integrated with a lens, control electronics, and an interface[7]. It gets interfaced with Raspberry Pi into the locket module to stream live video as shown in Figure 4. The real model is shown in Figure 5.



Fig 5: Camera Module

## V. RESULTS

It is a well-known fact that women outside their homes are rarely safe as one or more disasters are waiting upon them but with this smart shoe that immediately sends live video streaming to your contacts, the cases would be soon diminished to zero.

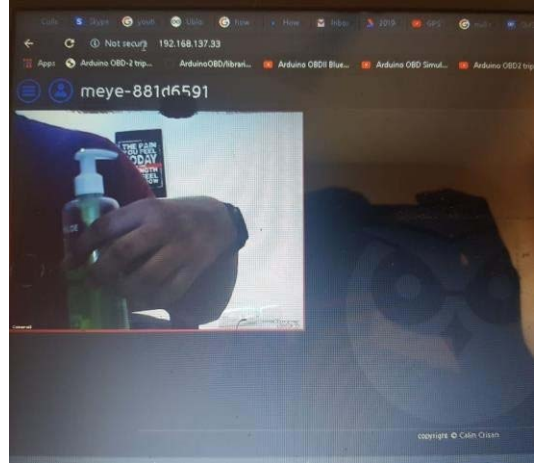


Fig 6: Live Streaming

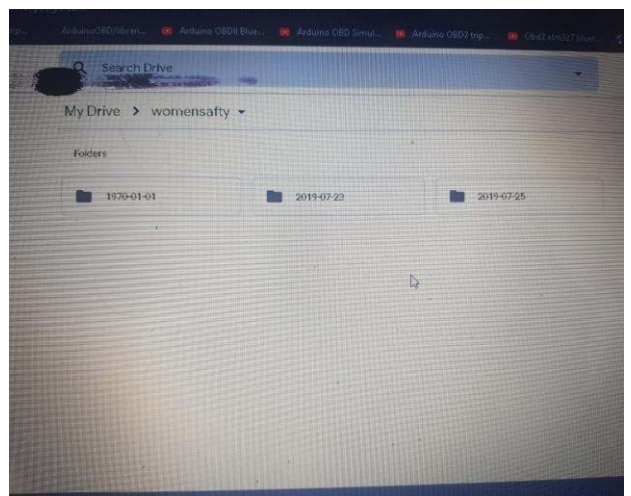
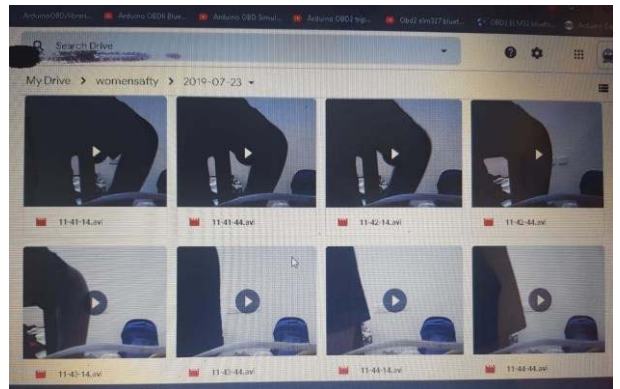


Fig 7: Videos Stored



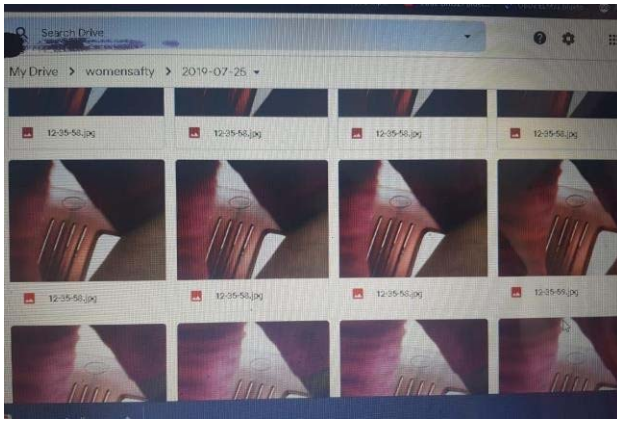


Fig 8 Images Stored

In emergency situations, as soon as the button is pressed, through motioneyeos, a folder Women Safety is created as seen in Figure 7 and the images and videos get stored in another folder within it (Figure 8) with the date of the accident. Figure 6 shows Live Streaming of the content on pressing the emergency switch.

## VI. CONCLUSION AND FUTURE SCOPE

The life-saving effective shoe comes in a low cost and gives benefits in the long term too as criminals may fear being caught and would think a lot of times before attacking anybody. Women won't feel helpless anymore and can walk out at any time of the day without concerning about their safety. Our proposed system is very durable and provides consistent results. In future, using nanotechnologies and embedded system designs, the camera module can be immersed inside a locket or any other wearable which would give the access to capture the face of the attacker with relative ease.

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